Residue management

Market support and research needs

Tony Brightling

Alwani Pty Ltd
PO Box 116
Parkville Vic 3052

alwani@tpgi.com.au
ph: (03) 9347 3099

Contents

Executive summary

There are three parts to this review:

- a residue risk assessment;
- a discussion about residue testing requirements for the EU market; and
- a review of management arrangements for the industry-funded programs managed by NRS.

The risk assessment includes a brief description of each of the main residue risks to the meat industry. The likelihood of unacceptable residues is assessed, together with a summary of recent results from the NRS residue monitoring survey. There is also an appraisal of market sensitivity. A risk mitigation strategy is suggested, taking into account the nature of the residue problem and the probability and likely impact of a residue incident.

The risk assessment looks at the big picture, allowing the various residue threats to be viewed in perspective and prioritised. It is intended to facilitate sound decision-making about residue risk management and a balanced portfolio of residue project work.

The profile of chemicals in the NRS residue monitoring survey reflects the risk assessment findings. The current system of regularly reviewing chemicals included in the survey is working well. A raft of minor changes is suggested to the profile of chemicals tested. However, this is 'fine-tuning' – no major changes are needed.

Over the next twelve months, SAFEMEAT needs to consider and develop national policy on a number of emerging residue issues, such as monitoring antimicrobial resistant organisms and the management of genetically modified material in the animal food chain.

Safe grazing intervals need to be established and made readily available for chemicals that pose a residue risk from consuming contaminated pasture or stock feed.

The approach to residues by our trading partners is changing, with less emphasis on traditional residue concerns, such as heavy metals, and increasing interest in the microbiological status of meat and on new classes of chemicals, such dioxins and endocrine disruptors. An active watching brief must be maintained across the full range of meat residue issues, so that critical residue intelligence does not pass unrecognised. This should be a clear part of the NRS brief.

The EU requires a higher rate of residue monitoring than is needed for access to other markets. This significantly increases the cost of the residue monitoring survey, particularly for the sheep industry where product destined for the EU cannot be readily identified and streamed prior to slaughter, so the higher rate of testing applies to all sheep killed in EU accredited works.

Options for reducing the cost of compliance with EU residue testing requirements are discussed. The Sheepmeat Council needs to consider compliance with EU residue testing requirements, taking into account the additional costs involved, market access risks, value of the EU market and beneficiary-pays principle.

Industry representatives should be intimately involved in all future market access negotiations that involve significant residue compliance costs.

The review of NRS management arrangements was initiated in part because of industry concern about alienation from the NRS decision making process. The implications of the Banham report were of particular concern. It seemed that decisions about NRS focussed on Government needs, with much less importance given to the commercial relationship between NRS and its client industries. An inability to transfer industry funds from NRS to MLA for residue research purposes and a more aggressive approach by AFFA to recovery of corporate overheads added to industry unease.

AFFA has recently responded to the Banham recommendations. It seems the strategic direction proposed in the Banham report (AFFA opting out of a partnership with industry on residue matters and acting only in service delivery mode) will not be pursued. This alleviates much of industry concern.

NRS should continue to manage the residue monitoring survey for the cattle and sheep industries. NRS should also continue to provide a laboratory proficiency evaluation service for meat residues, but with an increased proportion of costs borne by participating laboratories.

A stock take of residue laboratory capability in Australia and New Zealand is needed. It may be necessary to actively encourage laboratories to establish and maintain proficiency for some tests for which there is little commercial demand.

Residue R&D should be funded through and managed by MLA.

Alternative service providers should be actively explored for management of the targeted residue control programs. It is proposed that management briefs are prepared for the HGP and NARM/TART programs, and that expressions of interest are sought nationally for program management.

Management of the NORM program should also be contestable. However, the immediate priority is to implement operational changes to the program. NORM has languished for the last two years, with changes urgently needed but delayed by funding uncertainty and various reviews. NORM is a large and complex program. If NORM management was put out to tender, there would be a hiatus of at least twelve months, and possibly much longer, whilst the new management arrangements are bedded down. This delay must be considered against potential efficiency gains from changing program manager. It is recommend that NRS continues as NORM program manager for the time being, and that priority is given to implementing recommendations from the 2001 review of targeted testing programs.

The cattle and sheep industries need to take a more active role monitoring NRS service delivery and costs.

Funding for Cattlecare, Flockcare and National Vendor Declarations (NVDs) should be channelled through MLA rather than NRS.

Cattle industry reserves held by NRS are excessive and need to be managed down. Sheep industry residue levies should be left unchanged for the next twelve months. Although sheep industry reserves are higher than necessary, income is expected to decline.

Data protection concerns need to be addressed. There should be a formal industry-government agreement on data protection. Residue data held by NRS should be available for use by the Commonwealth Government within the agriculture portfolio, but should not be made more widely available without prior approval from the industry funding the program.

The 2001 review of targeted residue testing programs and the AEMS risk assessment of plantations and horticultural crops need to be implemented.

Tony Brightling

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Recommendations

Residue risk assessment

1. The current system of reviewing the profile of chemicals in the residue monitoring survey continues as is. The raft of minor changes suggested as a result of this risk assessment is considered at the next scheduled review.

2. Over the next twelve months, SAFEMEAT develops national policies on monitoring antimicrobial resistant organisms and the management of genetically modified material in the animal food chain.

3. Safe grazing intervals are established and made readily available for chemicals that pose a residue risk from consuming contaminated pasture or stock feed.

4. An active watching brief is maintained across the full range of meat residue issues.

EU residue testing requirements

5. The Sheepmeat Council considers options for compliance with EU residue testing requirements, taking into account the additional costs involved, market access risks, value of the EU market and beneficiary-pays principle.

6. Industry representatives are more closely involved in all future market access negotiations that involve significant residue compliance costs.

Residue program management

7. NRS continues to manage the residue monitoring survey for the cattle and sheep industries.

8. NRS continues to provide a laboratory proficiency evaluation service for meat residues, but with an increased proportion of the costs borne by participating laboratories.

9. There is a stock take of residue laboratory capability in Australia and New Zealand.

10. NRS continues as NORM program manager for the time being. Priority is given to implementing operational changes arising from the 2001 review of targeted testing programs.

11. A management brief is prepared for the HGP audit program. Expressions of interest are sought nationally for program management, for a two or three year period commencing 1 Jan 2004.

12. A management brief is prepared for the NARM/TART programs. Expressions of interest are sought nationally for program management, for a two or three year period commencing 1 Jan 2004.

13. MLA manages residue R&D projects for the cattle and sheep industries.

14. There is an independent efficiency audit of NRS, to ensure that non-contestable work is as cost-effective as possible, and there is no cross-subsidy of other industries.

15. Funding for Cattlecare, Flockcare and NVDs is channelled through MLA rather than through NRS.

16. NRS cattle industry reserves are slowly but steadily depleted to about 80% of annual expenditure.

17. Sheep industry residue levies are left unchanged for the next twelve months.

18. SAFEMEAT reviews its interaction with the States. The States need to have greater ownership of the SAFEMEAT process. Information flow, both ways, needs to be improved.

19. A data protection agreement is negotiated with AFFA, allowing residue data held by NRS to be used within the agriculture portfolio, but not made more widely available without prior approval from the industry funding the program.

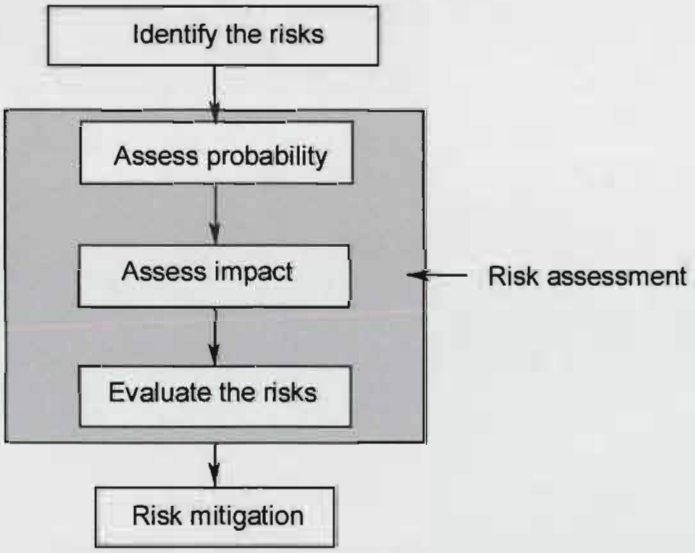
20. Recommendations from the review of targeted residue testing programs and the AEMS risk assessment of plantations and horticultural crops that have broad industry support are implemented without further ado.

Residue risk assessment

Risk assessment is a systematic decision-making process, by which potential hazards are evaluated, so that mitigation strategies, where appropriate, specifically target the most threatening risks.

In essence, risk assessment involves answering the following questions:

- What can go wrong?
- How likely is a residue incident to occur?
- What are the likely consequences of a residue incident?
- Does the expected impact of a residue incident (probability of occurrence x consequence if it occurs) justify preventive action? If so, what action is most appropriate?



In the pages that follow, there is a brief description of each of the main residue risks for the cattle and sheep meat industries. The likelihood of unacceptable residues is assessed, together with a summary of recent results from the NRS residue monitoring survey. There is then an appraisal of market sensitivity.

A probability x impact matrix has been used to assess the overall residue risk. A risk mitigation strategy is then suggested, taking into account the nature of the residue problem, and the risk and likely impact of a residue incident.

This risk assessment does not examine the technical issues in fine detail. Nor does it discuss operational aspects of the residue control programs currently in place. Rather, it attempts to look at the bigger picture, allowing the various residue threats to be viewed in perspective and prioritised. This is necessary given the multitude of potential residue threats and limited resources for risk mitigation.

The residue issues are presented alphabetically and not in order of assessed risk.

It has been assumed that:

- Product integrity and food safety issues will continue to be important market forces.
- The current random monitoring and targeted testing programs will be maintained in order to meet US, Asian and EU market entry requirements, and that the domestic requirements set out by FSANZ must also be fulfilled.
- Industry investment in residue risk mitigation will remain much the same. In the absence of an immediate residue incident, there will not be additional resources made available to address residue concerns.

The challenge is to utilise the available funds so as to have the greatest net impact on residue risk.

Key findings

The NRS residue monitoring survey reflects the risk assessment findings. The current system of reviewing the profile of chemicals in the survey every two years is working well. No major changes are needed. The suggested changes to the profile of chemicals tested are largely 'fine-tuning'.

The current system of reviewing the profile of chemicals in the residue monitoring survey every two years is working well.

Over the next twelve months, SAFEMEAT needs to consider and develop national policy on a number of emerging residue issues, such as monitoring antimicrobial resistant organisms and the management of genetically modified material in the animal food chain.

Industry policies are needed for some emerging residue issues, such as monitoring antimicrobial resistant organisms and management of genetically modified material in the animal food chain.

There is a significant risk of residues in livestock arising from the application of chemicals to plantations and other horticultural crops. Safe grazing intervals need to be established and made readily available for chemicals that pose a residue risk from consuming contaminated stock feed.

Safe grazing intervals need to be established and made readily available for chemicals that pose a residue risk from contaminated stock feed.

The approach to residues by our trading partners is changing, with less emphasis on traditional residue concerns, such as heavy metals, and increasing interest in the microbiological status of meat and on new classes of chemicals, such dioxins and endocrine disruptors.

For a number of residue concerns, the recommended strategy includes maintaining a watching brief. e.g. With antimicrobial resistance (where national policy is unfolding), PCBs and dioxins (where international policy is unfolding), and β agonists and other pesticides (where new product registration is expected).

It is important that an active watching brief is maintained across the full range of meat residue issues, so that critical residue intelligence does not pass unrecognised. NRS is best placed to carry out this strategic watching role – it should be a clear part of the NRS brief.

An active watching brief must be maintained across the full range of meat residue issues. It should be a clear part of the NRS brief.

Background

A number of classes of compounds are used for the control of gastrointestinal roundworms, lungworms, tapeworms and liver fluke in livestock. The products used most commonly as broad-spectrum anthelmintics in cattle and sheep are the benzimidazoles, imidazothiazoles, macrocyclic lactones and salicylanilides. These compounds can be administered either as an oral drench or as a controlled release oral capsule, by parenteral injection or as a backline pour-on. Some of the macrocyclic lactones also have activity and label claims against external parasites (lice and ticks).

Use in Australia

The following compounds are registered for use in Australia:

- benzimidazoles - albendazole, fenbendazole, oxfendazole and triclabendazole
- imidazothiazoles - levamisole
- macrocytic lactones - abamectin, doramectin, eprinomectin, ivermectin and moxidectin
- salicylanilides - closantel

Smaller volumes of the narrow spectrum anthelmitics morantel, napthalophos, nitroxynil and trichlorfon are also used.

Likelihood of residues in product

These compounds have been used for many years in Australia and there is a high degree of awareness with regard to WHPs and ESIs. There is a risk of residues arising from treatment regimes developed to address anthelmintic resistance, where double doses of one or more anthelmintics or combinations are administered without a concomitant increase in the WHP.

NRS monitoring program results (1999-2002)

Cattle – 2,737 samples with 1 non-compliance.

Sheep – 2,987 samples with no non-compliances.

Market sensitivities

Anthelmintics are used around the world and Codex and major trading partners have established MRLs for the major classes. Residues are unlikely to pose a risk to trade.

Management options

NRS has a comprehensive bank of monitoring data on the benzimidazoles and on levamisole indicating a high level of compliance. Consequently these compounds have not been included in the residue monitoring survey since July 2002. It is recommended that they are rotated back into the program after 2-3 years, in place of the macrocyclic lactones.

Background

Steroidal and non-steroidal anti-inflammatories (NSAIDs) are used in livestock for their analgesic, anti-inflammatory and antipyretic effects. There is concern in human medicine about the long-term toxicity of phenylbutazone, causing agranulocytosis, skin rash, peptic ulcers and bone marrow depression.

Use in Australia

The corticosteroids betamethasone and dexamethasone are registered in Australia for use in food animals with a 28-day withholding period. The only NSAID registered for use in cattle is flunixin. However, a number of injectable NSAIDs are registered for use in horses, including phenylbutazone, ketoprofen, carprofen, vedaprofen, meclofenamic acid, pentosan and ramifenazone. In the cattle industry, anti-inflammatories are most likely to be used to treat arthritic bulls and cows recumbent after calving. There is little need for anti-flammatories in the sheep industry.

Likelihood of residues in product

The withholding period for these compounds is generally the default of 28 days in horses. Residues are unlikely if the WHP is observed. However, monitoring programs in the USA have identified residues of phenylbutazone in dairy cattle.

NRS monitoring program results (1999-2002)

No non-compliant samples in 922 cattle and 338 sheep samples tested for phenylbutazone and flunixin. The corticosteroids have only recently been included in the NRS monitoring program.

Market sensitivities

There has been concern in Europe and the USA in recent years about the potential human health effects arising from exposure to phenylbutazone residues. There is not a long history of monitoring for corticosteroids internationally as suitable analytical methods have only become more widely available in recent years.

Management options

Continue to monitor for phenylbutazone and flunixin to build up a bank of data that may allow testing for this group of compounds to be rotated in and out of the testing program.

Consideration should be given to including some of the equine NSAIDs listed above in the screen test if that is feasible without significantly increasing the cost of testing.

Evidence that these chemicals are not a residue risk would be more compelling if high-risk animals, such as cull bulls and cull cows, were targeted for testing.

Antimicrobial residues

Background

Antimicrobials are used for the treatment and prevention of infectious diseases in humans and in domestic and food-producing animals. Some antimicrobials are used in food-producing animals for growth promotion, to increase feed efficiency or reduce the risk of ruminal acidosis.

Internationally there is a high level of concern and awareness about antimicrobial use in animals and the potential impact they may have on human health. Concomitantly, there is considerable confusion between the issue of antimicrobial *residues* and antimicrobial *resistance*. The contribution of antimicrobial residues in food to the development of resistant bacteria in the human gut is thought to be very small.

Use in Australia

Australia has adopted a comparatively restrictive approach to the registration and availability of antimicrobials for use in food-producing animals. The fluoroquinolones have never been registered for use in food animals and the registration of the following antimicrobials has been rescinded in the past 10 years – chloramphenicol, nitrofurans, numerous sulfonamides, streptomycin, dihydrostreptomycin and avoparcin. Most compounds used for therapy and prophylaxis are available only by veterinary prescription.

Virginiamycin is registered for use as a feed additive for cattle and sheep.

Likelihood of residues in product

In Australia, residue testing to date has focussed on compounds that are used at therapeutic doses and are more likely to cause residues (β-lactams, aminoglycosides, tetracyclines, sulfonamides and some macrolides). There are some compounds in the currently monitored classes of antimicrobials that are not tested for and there is no monitoring data for the cephalosporins or for ionophores and some of the low-dose orally administered compounds (these generally have short WHPs indicating less likelihood of residues in animal products).

NRS monitoring program results (1999-2002)

Cattle – 4,222 samples with 5 non-compliant – (4*neomycin, where the Australian MRL is significantly lower than Codex, EC and USA).

Sheep – 2,787 samples with none non-compliant.

Market sensitivities

Antimicrobial residues in Australian exports have caused problems in international trade with Canada, the USA and Japan over the past decade. There will continue to be a particular sensitivity in export markets in regard to antimicrobial residue and trading partners are likely to require testing of a broader range of compounds than is currently in place.

Management options

Consideration should be given to including the following compounds in the monitoring program:

- the cephalosporins (ceftofur)
- the aminoglycosides apramycin and gentamicin
- lincomycin.

In addition, it would be prudent to undertake an annual special purpose survey targeting high risk/use categories of livestock for other antimicrobials of interest. This should be a rolling program, targeting different antimicrobials each year. For example:

- chloramphenicol – exclude this from the monitoring program as there is ample data generated over the past decade, and include it in a rolling program every 4 or 5 years.

- nitrofurans – new analytical methods have resulted in detections of residues imported into the EU (not from Australia). It may be appropriate to reaffirm that these compounds are not being misused.

- fluoroquinones – Australia could use the fact that fluoroquinones are not registered for use in food animals as a marketing tool. Data to demonstrate compliance may be helpful.

While it is unlikely that residues will be found, such a targeted program would give a broader coverage, over a number of years, than is provided by the current monitoring program.

Background

In recent years, there has been an increasing international concern about the threat to public health arising from the development of resistance to antimicrobials that are critical for treating serious bacterial infections in humans. By far the greatest contribution to the development of resistance comes from the misuse of antimicrobials by the medical industry, in particular, in hospitals.

However, it is well documented that the use of antimicrobials in animals can lead to the development of resistance in zoonotic and commensal organisms. The resistant organisms can then colonise humans with the potential to cause serious illness that is not able to be readily treated. This contribution, though generally agreed to be very small, has attracted significant public scrutiny of the use of antimicrobials in food animals.

The situation in Australia

Antimicrobial resistance and the use of antimicrobials in food animals were examined in the JETACAR Report released in 1999. The Commonwealth government largely accepted the 22 recommendations in the report and they are now in the process of being implemented by the Commonwealth Interdepartmental JETACAR Implementation Group (CIJIG). Important recommendations for the food animal industry included:

- A review of antimicrobial growth promotants by the NRA to comply with the principle that antimicrobials should not be used as growth promotants if this use has the potential to cause the development of resistance or cross-resistance to antimicrobials important for animal and human health.
- All antimicrobials should be available by prescription only.
- Monitoring and surveillance programs should be instituted for the use of antimicrobials and for antimicrobial resistance in both the human and animal sectors.
- Appropriate legislation needs to be in place in all jurisdictions to control the use of antimicrobials in food animals.
- Prudent use guidelines need to be developed, distributed and used by the various sectors.
- Research and development should be focussed on alternative management practices and therapeutics to minimize the use of antibiotics.
- The establishment of an expert technical group to provide advice to government and industry on issues related to antimicrobial resistance.

Antimicrobial resistance data

There is a dearth of good quality data on antimicrobial resistance from food animal bacteria in Australia. What data there is, is held in private and government laboratories, is not in an easily accessible format, has not been generated using uniform standardised methods and is primarily directed against bacterial pathogens from sick animals. This data is of limited value in addressing the public health concerns arising from the use of antimicrobials in food animals.

Market sensitivities

There is no specific requirement at this stage by the major trading markets in red meat for a national antimicrobial resistance monitoring program. However, the OIE has developed guidelines for the management, monitoring and surveillance of antimicrobial resistance in animals and some EU countries, UK, USA, Japan and Canada have in place or are in the process of implementing national monitoring programs. It is only a matter of time before importing countries will require Australia to provide details of a national antimicrobial resistance management program, an important component of which will be monitoring data for antimicrobial resistance in bacteria of food animal origin.

Management options

Informal advice is that CIJIG is in the process of developing a national antimicrobial resistance management strategy, which includes a monitoring program for antimicrobial resistance in food animals. The proposed strategy is due for release for public consultation in early 2003. It will be important for the red-meat industries to review the document and provide appropriate comments.

Background

Clenbuterol is a sympathomimetic amine that blocks β2-receptor sites in the body, found primarily found in the lungs and uterus.

β-agonists also promote protein synthesis in muscle and lipolysis in adipose tissue (so called 'repartitioning agents') and for this reason there is a history of illegal use of *clenbuterol* and other β-agonists such as *salbutamol* as growth promotants in Europe, North America and China. There is a significant international black market in β-agonists for use in animals and there are reports of their use in athletes. There are well-documented cases of *clenbuterol* poisoning in humans in after consumption of *clenbuterol*-contaminated liver and lungs from vealers and pigs.

Use in Australia

Clenbuterol is registered in Australia for use as a tocolytic agent to facilitate or delay parturition in cattle and sheep, and as a bronchodilator in the treatment of respiratory disease in horses.

The NRA is currently considering registration of *ractopamine* for use as a growth promotant in pigs. *Zilpaterol* is registered and used a growth promotant in cattle in a number of countries, including Mexico and South Africa, but not yet in Australia.

Likelihood of residues in product

The growth-promotant effects are rapidly reversed when β-agonist use is discontinued. When used as growth promotants, it is quite likely that with product used up to the time of slaughter, residues would occur in liver.

NRS monitoring program results (1999-2002)

No non-compliant samples in 909 cattle and 608 sheep samples tested. The NRS undertook a targeted testing program for illegal growth promotant (including clenbuterol) use in beef carcase competitions at agricultural shows in 1999/2000. *Clenbuterol* residues were not detected in any of the samples tested.

Market sensitivities

There is a high degree of awareness and sensitivity in export markets about the potential use of β-agonists as growth promotants. From an Australian perspective, with the imminent registration of *ractopamine* for use in pigs, the potential for off-label use in cattle and sheep is increased. Should *zilpaterol* be registered for use in cattle, this could raise concern in the EU and some Asian markets.

Management options

The current testing for β-agonists should be maintained, with the screen test broadened to include *zilpaterol*. Some β-agonists can persist in the retina or other melanin-rich tissues for many months. Consideration needs to be given to whether retina, rather than urine, is the more appropriate tissue for testing to detect illegal use (as is done in Europe and North America).

In the event that *zilpaterol* is registered for use in cattle in Australia, it will need to be included as a proscribed chemical in the HGP-free Accreditation Scheme in order to allay market concerns.

Background

Cadmium is a naturally occurring element found in soils, rocks and water. The cadmium concentration in agricultural land reflects that in the parent rock. The use of phosphate fertilisers with relatively high levels of cadmium has led to widespread, yet low-level, contamination of agricultural soil.

Cadmium levels in plants are influenced more by the physical and chemical properties of the soil than the cadmium concentration per se. Sandy, acidic, saline and zinc-deficient soils have all been associated with higher levels of cadmium in both crops and pasture plants.

The main human health concern arises from long-term exposure leading to organ system damage, particularly cardiac and renal dysfunction.

Use in Australia

There have been numerous cadmium surveys and tests done throughout Australia. These suggest that the highest levels of cadmium occur in livestock sourced from WA and SA, followed by Victoria and to a lesser extent NSW and Tasmania. In 2001, NRS undertook a survey of cadmium levels in the offal of cattle and sheep at export abattoirs across a range of age categories. A report on the survey was provided to SAFEMEAT.

Likelihood of residues in product

Livestock ingest cadmium from grazing pasture/crops and from the ingestion of soil. Cadmium bioaccumulates in the liver and kidney, with concentrations generally higher in kidney than in liver.

NRS monitoring program results (1999-2002)

Cattle – 919 liver samples with no non-compliances.

Sheep – 857 liver samples with 32 non-compliances.

Australian MLs for cadmium were reviewed by FSANZ in 1997. MLs have been established in liver, kidney and meat. Published monitoring data from NRS is not stratified according to age. Historical and recent data indicate that the level of non-compliance in sheep and cattle kidney is higher than in liver.

Market sensitivities

MLs set by the EC are significantly lower than those in Australia. MLs are also under consideration by Codex, with levels proposed similar to those in the EU. The high level of non-compliance has the potential to create a perception for domestic consumers of a public health concern. Differences in MLs could lead to a trade issue in countries that have set MLs lower than those in Australia.

Management options

In 1993 in response to an EC requirement that cadmium levels in sheep not exceed 1 mg/kg, AQIS introduced measures at export abattoirs to ensure kidneys for the EU market are sourced only from lambs and hoggets (lambs only in WA). Risk management measures have also been introduced at SA domestic abattoirs to deal with high cadmium levels in aged livestock.

The approach to managing cadmium residues in Australia is inconsistent between jurisdictions and between export and domestic abattoirs and has the potential to create concerns in domestic and export markets. Consideration should be given to a national approach that would include:

- A review of the MLs for cadmium by FSANZ in view of the decreasing contribution offal makes to the Australian diet.
- Introduction of nationally consistent risk management measures to exclude non-compliant product from entering the export and domestic markets.
- NRS consider monitoring cadmium levels in kidney rather than liver. In addition, NRS monitoring samples should be taken from that component of offal that is passed for human consumption i.e. younger rather than mature or aged stock.

Genetically modified organisms (GMOs)

Background

With the development of technology that enables crops to be genetically modified (GM), there is the potential for inclusion of GM foods in animal and human diets. Many of the modifications introduced into plants by this technology are designed to confer resistance to herbicides and/or insect attack. Some GM crops also contain antibiotic resistance genes, incorporated into the DNA as markers of the desirable genetic trait inserted into the plant.

It is estimated that over 53 million ha of GM crops were grown worldwide in 2001, with the area of land planted growing at over 10% per annum. The leading growers of GM crops are the United States, Argentina, Canada and China.

The situation in Australia

The only GM crop licensed for commercial production in Australia is cotton, genetically modified for insect resistance and herbicide tolerance. However, field trials have been undertaken for canola, lupins, clovers, Indian mustard and sugarcane and it is likely that one or more of these crops will have GM lines under commercial cultivation in the foreseeable future. These all have the potential to enter the animal feed chain. Another potential source of GM contamination is the importation of grain or animal feeds containing GM components.

Market sensitivities

The rapid and widespread adoption of GM technology, particularly in some areas of agriculture, has led to fears that the technology and its products may compromise human health and environmental safety in the long term.

The anti-GM lobby claims, and consumers increasingly believe, that scientists and regulators have overlooked or underestimated problems with GM technology. Major food retailers and governments around the world are echoing this precautionary reaction. Specific concerns include:

- Possible 'escape' and uncontrolled multiplication of the GM crop species.
- Loss of biodiversity.
- Possible transfer of antibiotic resistance genes from plants to animals.
- Food safety, in particular the possibility of GM food containing new allergens and/or carcinogens.

Concern about the public health implications of eating GM food could damage the domestic market for red meat and/or cause international market access problems.

Management options

In the short-term, the red meat industry needs to maintain a watching brief on market sensitivities that may arise from feeding imported grains. Whilst this is most likely to be an issue for the pig and poultry industries in the first instance, it is also a potential issue for the lot feeding industry.

In the medium term, the Australian red meat industry needs to develop a contingency plan to deal with accidental contamination of feed with GM product.

A long-term plan is also needed to address the reality of commercial domestic GM crops contributing to the animal feed chain. Issues that need to be considered are:

- Market access requirements relating to labelling, certification and verification.
- Mechanisms for segregation of GM and non-GM product.
- Bolstering through-chain HACCP, quality assurance and product integrity programs to accommodate GM feeds.

Hormonal growth promotants

Background

HGPs are used to increase the efficiency of feed conversion, muscle mass and carcase leanness in cattle. They include products that contain naturally occurring compounds such as testosterone, 17β-oestradiol and progesterone or the synthetic compounds melengestrol acetate (MGA), trenbolone and zeranol.

Use in Australia

All of the above compounds, with the exception of MGA, are registered for use in Australia and are formulated as slow-release implant pellets injected subcutaneously under the skin of an animal's ear. MGA is a feed additive that is used in heifers to suppress oestrus.

Likelihood of residues in product

Since levels of the naturally occurring HGPs are similar in tissues from treated and untreated animals and the total dietary intake is much lower than the amounts produced endogenously in humans, setting of ADIs or MRLs has been considered unnecessary in Australia and by Codex. Residues of the synthetic HGPs in edible tissues are well below the MRL within 24 hours of administration.

NRS monitoring program results (1999-2002)

Cattle - 4,917 tested with 2 non-compliances.

Sheep - 1,665 tested with 7 non-compliances. All were for nor-testosterone or boldenone and unlikely to have been due to administration of product, but rather due to endogenous production.

Market sensitivities

In 1997 the WTO ruled that the European ban on the importation of beef and beef products from countries that allowed the use of HGPs was not based on scientific evidence or a thorough risk assessment. In response, the EC has released two risk assessments (in 1999 and 2002) that have adopted a precautionary approach. The EC claimed that 17β-oestradiol is a carcinogen and that progesterone, testosterone, melengestrol acetate, trenbolone and zeranol should all be considered as having the potential for endocrine disrupting, developmental, genotoxic and carcinogenic effects in the absence of data to provide an alternative view. It is unlikely that the EC will be persuaded from backing down from this position and the ban is likely to continue for the foreseeable future.

The EC position has created interest in some of Australia's Asian markets and it is possible that either at a government level or at individual importer level, these markets may seek the same HGP-free assurances, particularly in respect of 17β-oestradiol.

Management options

The current EU Cattle Accreditation Scheme provides the mechanism for the supply of HGP-free product to the EC and any other interested markets. An important aspect of this scheme is on-farm auditing and verification testing of eligible cattle. Current testing is limited to the synthetic HGPs.

With the advances that have been made in human antidoping testing in sport, it may now be feasible to develop methods that can differentiate endogenously produced from administered natural hormones in cattle. This would lend greater credibility to the verification testing that underpins the EU Cattle Accreditation Scheme.

A better understanding is needed of the endogenous physiological concentrations of nor-testosterone and boldenone, particularly in sheep in order to be able to explain the relatively high rate of non-conformances detected in the monitoring program.

Insect growth regulators

Background

The insect growth regulators (IGRs) are a newer class of insecticide with a much higher margin of safety than some of the older compounds such as OCs, OPs and SPs. They disrupt the metamorphosis processes of insects by inhibiting the synthesis of chitin or by mimicking or blocking the hormones that control moulting. They generally have a low water solubility and low mammalian toxicity.

Use in Australia

The following chitin synthesis inhibitors have been or are registered for use on crops or livestock in Australia: chlorfluazuron, cyromazine, diflubenzuron, fluazuron, and triflumuron. Juvenile hormone mimics include methoprene and dicyclanil.

Likelihood of residues in product

The IGRs are stable compounds with a relatively long half life. IGR residues can persist in animal fat for weeks to months and in the case of chlorfluazuron (CFZ), for years. The time taken for residues to deplete to non-detectable levels can be weeks to months resulting in long ESIs (dicyclanil 120 d, triflumuron 66 d, fluazuron 42 d, diflubenzuron 21-42 d, cyromazine 14 d).

NRS monitoring program results (1999-2002)

Cattle - 920 samples with no non-compliances

Sheep - 1,679 samples with 1 non-compliance (cyromazine).

Market sensitivities

Ever since the CFZ residue crisis in Australia in 1994, there has been a high degree of awareness of the potential for IGRs to cause problems in export markets, if only for the reason that many of these compounds are not registered or used in agriculture in these markets and a zero tolerance applies. This is despite the fact that they are, as a group, among the safest chemicals from a human health perspective.

Management options

Because of the potential for market disruption resulting from the lack of Codex and international MRLs and the consequent very long ESIs for some of these compounds, it is advisable to continue the level of monitoring that is currently undertaken by NRS. Dicyclanil, with its ESI of 120 days, should be added to the sheepmeat testing program.

ESIs are an important tool in managing residues in export product and will need to be kept under review as Codex MRLs are progressively established.

There are other IGRs that could be potentially registered for use on crops and that could cause the same problems as CFZ and FZ. A watching brief needs to be kept on the registration of new IGRs for use in animals or on crops or in horticulture.

Background

The 'natural toxins' are a human health concern, that could possibly flow on to affect the domestic market or export trade for Australian agricultural produce, from a real or perceived natural toxin episode. Natural toxins can cause a range of illnesses ranging from acute toxicity with gross contamination to long-term debility with recurrent low level exposure.

The situation in Australia

A number of attempts have been made and reports written on the risk profile of natural toxins for the primary industries (Nicholls 1993, Sykes *et al* 1997 for MLA, SCARM Working Group on Natural Toxins July 2000). For the red meat industry, the priority risks have been identified as:

Corynetoxins: These are a group of compounds produced by the bacterium *Rathayibacter toxicus*, which colonises the seedheads of several plants including annual ryegrass (*Lolium rigidum*), blown grass (*Agrostis avenacea*) and annual beard grass (*Polypogon monspeliensis*). The bacteria are carried to the seedheads by nematodes of the genus *Anguina*, which form galls on the seedheads in which the bacteria multiply. Ingestion of contaminated feed produces neurological disease known as annual ryegrass toxicity or flood plain staggers. The corynetoxins are potent inhibitors of protein glycosylation. Corynetoxins have caused large scale livestock mortalities in the grain belt in WA and SA. Corynetoxin contamination is primarily an animal health issue, but an effect on human health, from consuming either contaminated grain or affected livestock, cannot be ruled out.

Pyrrolozidine alkaloids (PAs): These are toxic secondary metabolites produced by a variety of plants. In Australia they occur mainly in the weeds *Heliotropium europaeum* (Heliotrope), *Echium plantagineum* (Paterson's Curse), *Crotolaria spp* and *Senecio spp.* The toxicity to livestock grazing PA-containing plants over an extended period is well recognised. A number of acute, large-scale human poisonings have occurred from ingestion of contaminated grain or herbal medicines. However, recurrent, low level exposure is also a human health concern. The major pathology in humans and animals occurs in the liver where there is cumulative long-term tissue damage.

Phomopsins: These are produced by the fungus *Diaporthe toxica*, which infects lupins. When consumed by livestock they can cause lupinosis, an often fatal liver disease. Phomopsins are potent cytotoxic and antimitotic substances that target hepatocytes. Lupinosis occurs in WA, SA and some parts of Victoria and NSW where sheep graze lupin stubbles. The human health concern is that toxin ingested in offal may have a similar hepatocytotoxic effect.

Likelihood of residues in product

Corynetoxins are highly stable and will persist in stored fodder. However, little is known about their levels in human foods or their bioavailability, and 'no effect levels' have not been established for humans

The major source of PAs in the Australian diet is grain, with a minor contribution from dairy products, eggs, offal and honey.

The offal of animals intoxicated by phomopsins retains compounds with the same toxic action. Australa is the only country in the world to have established MLs for phomopsins.

NRS monitoring program results (1999-2002)

There is no systematic monitoring of natural toxins in Australian produce. Some surveys of produce have been undertaken on a state or industry basis or for research purposes. While some of this has been published, the data is not readily available.

Market sensitivities

To date, there has been much less consumer concern about natural toxins than about other residues, particularly agvet chemicals. However, there is an international trend to increase the regulation of natural toxins in food. As yet, very few Codex standards have been established for natural toxins. Trade disruption could arise in the future as more national standards are set.

Until recently, corynetoxins were a uniquely Australian problem, however they have now also been reported in South Africa. The restricted geographical range increases the risk that corynetoxins might be used as a non-tariff trade barrier. They have previously been linked to livestock deaths in Japan through the export of contaminated hay from Australia.

Management options

A SCARM Natural Toxin Working Group has put forward a series of recommendations about the future management of natural toxins in agriculture, including the establishment of a national management committee (AusToxNet). The SCARM recommendations principally involve greater cross-industry and government communication and coordination.

A low-key watching brief is needed.

Background

Organochlorines are banned from use in agriculture and pest control practices in the developed world because of their environmental impact and risk to human health arising from very long persistence in the environment and bioaccumulation in fat through the food chain. There is also increasing concern over chronic low-level environmental exposure leading to impaired immune and reproductive function and carcinogenicity.

Use in Australia

The persistent OCs such as DDT, dieldrin, heptachlor, HCH and HCB have not been available for use on livestock since the early 1960s and all other uses and imports were prohibited by 1987. However OCs are still present in soil where they were used for spot and broadacre treatment to control and prevent pests in the environment and on crops. Endosulfan, a relatively non-persistent OC, is still registered for use on certain crops, but not on livestock.

Grazing on land formerly used for growing tobacco, bananas, sugar or potatoes represents the highest broadacre risk of OC contamination of livestock. Point source contamination is associated with old dip sites, chemical storage areas, rubbish dumps, and areas treated with OCs for termite control – power poles, stockyards, farm outbuildings and houses.

Likelihood of residues in product

Grazing livestock become exposed to and contaminated with OCs when they ingest contaminated soil or plant material with adherent contaminated soil. The level of OC residues in the general Australian livestock population is low, but there is the potential for livestock from OC-contaminated properties to have very high levels of OC residues and to be sold for human consumption.

The National Organochlorine Residue Management (NORM) Program and the Endosulfan Management Strategy aim to minimise the risks of OC residues disrupting the market for Australian beef.

NRS residue survey results (1999-2002)

Cattle – 1,775 samples with 3 non-compliances.

Sheep – 2,005 samples with 1 non-compliance.

OC residue non-compliances in the NRS residue monitoring survey have stabilised at a very low level. OC residue levels and non-compliances in the NORM program are much higher, as would be expected in a testing program that targets cattle from known OC-contaminated properties.

Market sensitivities

The detection of OC residues in Australian beef (North America late 1980s and early 1990s) and endosulfan residues in Australian beef (North Asia late 1990s) have cost the Australian meat export industry tens of millions of dollars in trade disruption and on-going risk-management programs. Because OCs can persist in the environment for decades, OC residues will pose a significant threat to trade for many years to come. Effective residue management and control at the farm level is essential.

Management options

The residue monitoring survey continues to provide background data on the Australian livestock population as a whole. Given the large bank of historical data and low levels of detection, the number of samples in the residue monitoring survey could be reduced to a base level of 300 samples annually.

An effective and on-going national management program is essential to manage the risk of OC residues in livestock. The NORM program, or something similar, will be required for many years yet. Where possible, the program should place economic responsibility on individual producers to actively manage OC-contaminated land so as to minimise residue risks.

During 2001 a major review of the NORM program was undertaken on behalf of SAFEMEAT, and a raft of recommendations made about fine-tuning the NORM program. The recommendations from that review need to be implemented.

Quality assurance and traceability systems are an important part of the cattle industry's OC risk management strategy. During this review, serious concern was expressed about the integrity of NVDs. This needs to be addressed.

Background

Organophosphate (OP) compounds are widely used as insecticides in agriculture. They are esters, amides or derivatives of phosphoric and thiophosphoric acids and act by the inhibition of acetylcholinesterase. OPs vary greatly in their toxicity and depending on their physical, chemical and toxicological properties, can be administered topically as contact poisons or as selective systemic insecticides.

The principal human health concern in relation to OPs is from occupational exposure through direct contact with the skin or from inhalation. Acute and chronic exposure to OPs have both been associated with neuropsychological abnormalities, peripheral neuropathy and psychiatric illnesses.

Use in Australia

OPs are used in livestock mainly as external parasiticides to control buffalo fly, blowfly, ticks and lice in products containing chlorfenvinphos, chlorpyrifos, coumaphos, diazinon, famphur, fenthion, maldison, phosmet, propetamphos and temephos. Napthalophos is used as an anthelmintic in sheep. There are numerous OPs used as insecticides on pasture, crops and in horticulture including fenitrothion, ethion and chlorpyrifos-methyl.

Likelihood of residues in product

Livestock can become contaminated with OPs through direct exposure to parasiticides and indirectly through feed following direct treatment of grains, crops or pasture or from spraydrift. In general, OP insecticides are rapidly broken down and produce little or no tissue residues. The one exception is temephos, where the WHP is 42 days and the ESI is 120 days.

NRS monitoring program results (1999-2002)

Cattle – 1,775 samples with no non-compliances

Sheep – 2,005 samples with no non-compliances.

In addition, OPs are tested as part of the screen test in the NORM OC program, so there is a substantial bank of data on OP residues.

Market sensitivities

Although there is a high level of compliance with Australian MRLs for OPs, this group of compounds are a potential trade risk in markets where there is no, or a lower MRL than in Australia.

Management options

Monitoring could be reduced to a baseline level of 300 samples per year, in line with the suggestion for OCs. However, consideration should be given to the inclusion of OPs that are directly applied to livestock and are not part of the current OP screen test - famphur, phosmet, propetamphos and temephos.

Background

PCBs are chlorinated aromatic hydrocarbons that are synthesised by direct chlorination of biphenyl. Depending on the number and position of chlorine substituents, there are 209 theoretically possible congeners (closely related chemicals derived from the same parent compound). Due to their non-flammability, chemical stability, high boiling point, low heat conductivity and high dielectric constants, PCBs were widely used in industrial and commercial applications such as hydraulic and heat transfer systems, cooling and insulating fluids in transformers, and in pigments, dyes, copy paper, paint, sealants, plastic and rubber products. The production and use of PCBs has been discontinued in most countries. PCBs can be divided into two groups based on their biochemical and toxicological properties – the 'dioxin-like' co-planar PCBs and others.

The term '*dioxins*' encompasses a group of 75 polychlorinated dibenzo-*p*-dioxin (PCDD) and 135 polychlorinated dibenzofuran (PCDF) congeners. Dioxins serve no useful purpose. They are not intentionally produced, but rather are unintended by-products released in small quantities from incomplete industrial and natural combustion processes e.g. power generation, waste incineration, chemical manufacture, bushfires and volcanic activity.

Since PCBs and dioxins are not found as single compounds but as complex mixtures of congeners, the concept of toxic equivalents (TEQs) has been developed. This allows the toxicity of a complex mixture to be estimated and expressed as a single number. The differences in toxicity of the various congeners are expressed in toxic equivalency factors (TEF) that are estimated from the weaker toxicity of the respective congener in relation to the most toxic congener 2,3,7,8-TCDD, which is assigned the arbitrary TEF of 1.

Use in Australia

Never used in agriculture. No longer used industrially.

Likelihood of residues in product

Dioxins and PCBs occur in trace amounts as contaminants in air, water and soil throughout the world. They are lipophilic compounds that are extremely resistant to chemical and biological degradation and persist in the environment. They concentrate in body fat after ingestion and bioaccumulate under conditions of long-term exposure, both in humans and animals. A recent US EPA assessment of dioxins (2000) concluded that over 90% of human exposure to dioxins occurred via ingestion of food, primarily from meat, dairy products and fish.

NRS monitoring program results (1999-2002)

Dioxins have not been routinely monitored and there is little data on dioxin levels in the environment or in food and animal products. A number of government agencies (state and federal) have commenced gathering data on the prevalence of dioxins in Australia under the auspices of the National Dioxin Program, agreed to by the Australian and New Zealand Environment and Conservation Council in 2001.

Market sensitivities

Australia is a signatory to the May 2001 Stockholm Convention on Persistent Organic Pollutants (POPs) which include PCBs and dioxins. Parties to the convention are required to minimise releases of POPs, put in place national action plans and monitor emissions. Australia's major red meat markets (USA, Canada, EU, Japan and Korea) have dioxin monitoring programs in place and would have an expectation that Australia can produce data on dioxin monitoring in agricultural products. Dioxins are classed as endocrine disruptors.

Management options

NRS is currently conducting a monitoring program for dioxins in a range of agricultural produce. It is important that sufficient data is generated to provide a credible snapshot of the dioxin status of Australian meat. Dioxin testing is horrendously expensive. Future management options will depend on the results of the current survey.

Synthetic pyrethroids

Background

The synthetic pyrethroids (SPs) are a diverse class of potent broad-spectrum insecticides used widely in both agriculture and domestic households. They are based on the chemical structure and biological activity of pyrethrum, a natural extract from plants of the genus *Chrysanthemum*. The development of SPs has involved extensive chemical modifications to make the compounds more toxic to target pest species and less photo labile. SPs are potent neurotoxins, interfering with the permeability of nerve cells and hence transmission of nerve impulses.

Use in Australia

SPs are widely used as insecticides on pasture, crops and in horticulture. Cypermethrin, cyhalothrin, deltamethrin, fenvalerate, flumethrin and permethrin and isomers of some of these compounds are all used as external parasiticides in livestock. Some of these are also used on pastures and crops and in horticulture, as are bifenthrin and cyfluthrin. Allethrin, bioallethrin, bioresmethrin, phenothrin, tetramethrin and transfluthrin are all used as household or industrial insecticides.

Likelihood of residues in product

Livestock can become contaminated through direct exposure to SPs or indirectly from feed, grains, crops or pasture, which has been treated directly or is contaminated from spraydrift.

Most synthetic pyrethroids exhibit a biphasic depletion curve in animal fat. There are effectively two half lives. Initially there is rapid residue depletion, to below the established MRL, with a half life in the order of a few days. Later, there is a much longer half life, with weeks or months required for residues to deplete to non-detectable levels. Where no MRL is established, a WHP (or ESI) of several months may be required.

SPs can persist on dry pasture for weeks and spraydrift from aerial application to crops or plantations poses a risk of residues in livestock grazing those pastures.

NRS monitoring program results (1999-2002)

Cattle – 4,827 samples with 4 non-compliances, all for bioresmethrin.

Sheep – 2,414 samples with no non-compliances.

Market sensitivities

To date, synthetic pyrethroids have not caused any market disruption or concern, with the exception of the bioresmethrin incident in Korea in 2000. Australia has more SPs registered for use in livestock and in horticulture than most of our export markets, so the potential exists for exporting product that complies with Australian MRLs where importing countries have a lower MRL or nil tolerance.

Management options

Large numbers of samples have been tested in the residue monitoring survey over the past three years, with a high degree of compliance. Given the bank of historical data from the residue monitoring survey and from targeted testing in the NORM program, the number of samples tested in the residue monitoring survey could be reduced to 300 per year. However, it would be desirable to broadening the screen to include bifenthrin, which is used in horticulture.

The use of ESIs is important in avoiding residues in export product.

Other insecticides

Background

There are a number of other insecticides used on livestock, crops and/or pastures. In 2000, NRS commissioned, on behalf of SAFEMEAT, a consultancy to assess the risk of residues in livestock arising from the application of chemicals to plantations and other horticultural crops. SAFEMEAT convened a working group to consider the recommendations. These should be considered in conjunction with the following additional comments.

Carbamates are effective against a wide range of insects in the home, industrial sites and in agriculture. They are reversible inhibitors of cholinesterase.

Spinosad is a mixture of the two most active naturally occurring metabolites (spinosyns A & D) produced by the soil actinomycete *Saccharopolyspora spinosa*. Spinosad activates the nicotinic acetylcholine receptors leading to involuntary muscle contractions, prostration and paralysis. Spinosad is degraded by exposure to light, with a half-life of 9-10 days in soil and a shorter half life on an exposed leaf surface.

Chlorfenapyr is a pyrrole insecticide that is metabolised to the active form in the target pest. The active form uncouples oxidative phosphorylation in mitochondria, causing cell death. Insects are more efficient than vertebrates in converting chlorfenapyr to its active form.

Fipronil is a member of the phenyl pyrazole class of pesticides, which are principally chemicals with an herbicidal effect. It is a broad-spectrum insecticide that acts as a potent disruptor of the insect nervous system via the GABA regulated chloride channel. It is degraded by sunlight to produce a range of metabolites, one of which is extremely stable and more toxic than the parent compound. It is generally applied at low to very low dose rates.

Use in Australia

Bendiocarb is registered for use as a lousicide and for fly control in cattle. There are numerous carbamates registered for use in horticulture and on crops.

Spinosad is registered for the treatment and control of blowfly strike in sheep and as an insecticide in a range of fruit, vegetable and flower crops, as well as cotton.

Chlorfenapyr is registered for use on cotton, some fruit and some vegetable crops, but not for direct use on livestock.

Fipronil is not registered for use on livestock, but is registered for use on a wide range of horticultural and agricultural crops, including cotton and pasture, and for locust control.

Likelihood of residues in product

Carbamates are excreted rapidly, mostly in urine, and do not accumulate in mammalian tissues. They are unlikely to pose a residue risk.

Spinosad residues are unlikely to arise in livestock from ingestion of crops and crop byproducts treated with spinosad provided WHPs and grazing WHPs are observed. However, a potential risk arises with livestock given feed or pasture contaminated by spray drift where the appropriate WHP is not observed out of ignorance of the contamination.

Chlorfenapyr is quite persistant in the environment - the soil half-life quoted in the literature varies from 9-17 months. In 2001, the US EPA determined that chlorfenapyr does not meet the requirements for registration, and in response, American Cyanamid withdrew their application for registration. The US EPA decision was based on the conclusion that chlorfenapyr is persistent in the environment and causes severe effects on bird reproduction. Further, the EPA determined that the environmental risks outweighed likely economic benefits.

Fipronil metabolic studies show that there is a potential for bioaccumulation in fatty tissue. A grazing WHP of 14 days is recommended. No export grazing WHP or ESI is publicly available for fipronil.

NRS monitoring program results (1999-2002)

None of the compounds listed above has been included in the NRS monitoring program to date. Informal advice is that spinosad has been included in targeted testing in relation to its use on cotton and that fipronil was included in the targeted testing program associated with spraying for plague locusts in 2000/2001.

Market sensitivities

MRLs in animal products have not been established by Codex for spinosad, chlorfenapyr or fipronil. Tolerances have been established in the USA for animal commodities for spinosad and fipronil and are higher than the corresponding Australian MRLs. Residues of these products could pose a trade risk in those markets where MRLs have not been set or which use Codex MRLs.

Management options

Safe grazing intervals need to be established and made readily available for chemicals that are a residue risk from inadvertent ingestion by livestock as a result of spray drift or the consumption of contaminated feed.

Some of the information required may be held by NRA. This should be assessed in conjunction with the consultancy report on Plantation Risk Assessment.

EU residue requirements

There are some particular problems with meeting EU market requirements.

The NRS monitoring survey sampling rate required by the EU is higher than for other markets. Sheep with product destined for the EU cannot be readily identified and streamed prior to slaughter, so the higher sampling rate applies to all sheep killed at EU accredited works. Whilst there are also additional testing costs for cattle slaughtered for the EU, they are not as great. As EU eligible cattle can be identified prior to slaughter, the higher residue sampling rate only applies to these cattle, not the entire kill at EU accredited works.

Increased sampling to comply with EU requirements is the principal reason why NRS monitoring survey costs to the sheep industry increased from $0.93 million in 2000/01 to $1.52 million in 2001/02.

The costs of meeting EU residue requirements are socialised. Processors and exporters of meat to the EU do not have to meet the additional residue testing costs required for market access, rather these costs are born by sheep producers at large. The 'beneficiary-pays' principle does not apply.

Possible solutions to the problem are:

- Let the status quo prevail. An easy option, but it locks sheep producers into spending an additional $600,000+ pa on residue tests.

- Re-negotiate (down) residue monitoring requirements with the EU, with the base sampling rate for other markets accepted as adequate and additional sampling for the EU market no longer required. This is the ideal solution. However, past history of residue negotiations with the EU do not imbue much confidence that there would be either a prompt or satisfactory outcome.

- Go back to the base sampling rate for other markets, wait for the EU to complain, strongly argue the scientific basis for the sampling schedule in place, and if absolutely necessary to maintain market access – increase the sampling rate again, with funding provided by meat processors and/or exporters supplying the EU. This has the advantage of immediate cost savings, but the risk of a backlash from the next EU residue inspection team. Whilst the additional costs of residue testing for the EU are socialised, suppliers to the EU are unlikely to offer a contribution, and the additional costs of exporting meat to the EU will not be borne by that market. However, if residue testing must be expanded again to protect EU market access, the beneficiary-pays principle can be applied much more readily.

There is no simple solution to the problem. Compliance with EU requirements substantially increases residue monitoring costs for the sheep industry, but any unilateral decision to reduce the number of samples tested puts market access at risk.

The Sheepmeat Council needs to consider compliance with EU residue testing requirements, taking into account the additional costs involved, market access risks, value of the EU market to the Australian sheep industry and beneficiary-pays principle.

A variation of option 3 is to go back to the base sampling rate for other markets if the meat processing and/or export sectors of the industry do not meet the additional residue testing costs required for access to the EU. This would highlight the significant cost of supplying the EU, with the additional costs of exporting meat to the EU borne by that market. However, there would almost certainly be strong resistance from the processing and export sectors of the Australian meat industry.

The Sheepmeat Council needs to consider compliance with EU residue testing requirements, taking into account the additional costs involved, market access risks, value of the EU market and beneficiary-pays principle.

At present, market access negotiations involving residues are conducted by AFFA (AQIS and NRS), with industry in the background. There is a problem with this arrangement - AFFA negotiators are inevitably averse to risk and conservative, as the Commonwealth bears some of the responsibility for resolving a residue incident, but none of the recurrent monitoring costs involved.

Whilst it is recognised that trade access agreements are on a government to government basis, and AQIS and NRS are key players in negotiating meat residue issues, industry representatives should be intimately involved in all future negotiations that involve significant compliance costs.

Industry representatives should be intimately involved in all future market access negotiations that involve significant residue compliance costs.

Residue program management

During 2001/02 there was a management restructure within NRS, with the previously full-time position of Director downgraded to a part-time appointment. There was no real consultation with industry about changes to the NRS senior management structure.

In February 2002 AFFA initiated a review of NRS by David Banham, a senior officer in the Department. The Cattle Council of Australia, Australian Lot Feeders Association and Sheepmeat Council of Australia all made significant inputs to the Banham review. Output from the review was a one-page dot point set of recommendations and a one-page dot point summary of participation and operating guidelines. The reasoning behind the Banham recommendations was not made available to industry, and at the time this review was commissioned there had been little genuine debate.

The Banham report recommended a significant shift in Government's approach to residue management, with no mention of community service obligations or public good. Rather, a commercial service delivery approach was proposed. There was no sense of an industry-government partnership in the Banham report, despite the mutual benefits that accrue from current residue testing arrangements. Industry benefits from NRS being a Government body, with implied independence and authoritative technical expertise. The Commonwealth benefits from access to credible data on the residue status of food produced in Australia, with the cost of generating the data met by industry.

The cattle and sheep industries invested over $5 million in residue management services provided by NRS in 2001/02. Another $11 million were held in NRS reserves. As major resource providers for NRS, the cattle and sheep industries ought to have been party to discussions about future management of the NRS program.

This review was initiated in part because of industry concern about alienation from the NRS decision making process, and the long-term implications for residue management if the Banham recommendations were implemented. It seemed that decisions about NRS focussed on Government needs, with much less importance given to the commercial relationship between NRS and its client industries. An inability to transfer industry funds held by NRS to MLA for residue research purposes and a more aggressive approach by AFFA to recovery of corporate overhead costs added to industry unease.

This review was initiated in part because of industry concerns about alienation from the NRS decision making process and the long-term implications of the Banham recommendations.

At a meeting in Canberra on 13 February 2003, convened to discuss the initial draft of this report, the Director of NRS explained AFFA's response to the Banham recommendations. A written response was later provided to the peak industry councils.

AFFA did not accept some of the Banham recommendations and there was qualified support for others. It seems the direction proposed in the Banham report (AFFA opting out of a partnership with industry on residue matters, acting only in service delivery mode) will not be pursued. This alleviates much of industry concern. It is time to move on.

Service delivery models

The prime reason for the cattle and sheep industries funding residue control is clearly to preserve and enhance access to both domestic and export markets. Given the amount of money invested in residue monitoring and control programs, it is prudent to explore alternative delivery arrangements that might provide cost, performance, or other advantages over the service provided by NRS. Where possible, service delivery should be made contestable. There may be alternative, better ways to achieve the required outcome.

It is worth noting that although NRS provides a comprehensive range of residue management services to the red meat and grain industries, and residue monitoring services to a raft of smaller industries such as honey, deer, horsemeat, kangaroo, ostrich, game pigs and emu - a number of other industries run independent non-NRS monitoring programs. These include the dairy, wool, dried fruits, wine grapes and tomato processing industries. There is no reason why the meat industry should not manage residue risks independently of NRS, or through a mix of NRS and other delivery arrangements.

In deciding whether or not to transfer responsibility for residue program management to another service provider, industry must be mindful of how this would be viewed by our trading partners. Given that the prime reason for residue control is to preserve and enhance market access, it is essential that residue control activities are credible to the regulators in our international markets.

There are five main elements to the residue control programs currently funded by the cattle and sheep industries through NRS:

- Residue monitoring survey
- Proficiency evaluation of residue testing laboratories
- Targeted residue control programs
- Residue R&D and special projects
- Quality assurance and printing of National Vendor Declarations (NVDs).

As the management needs for each element are different, they are considered separately.

Residue monitoring survey

The NRS residue monitoring survey is the primary means of satisfying our international trading partners that there is on-going residue monitoring in place. This is a mandatory requirement for meat exports to a number of key markets, including the USA, Japan and Europe. There is a clear expectation that the monitoring program will be independent, objective and scientifically sound. The cost of the NRS survey is shown in Table 1.

Table 1. NRS residue monitoring survey costs ($million)

	1999 / 2000	2000 / 2001	2001 / 2002
Cattle	1.38	1.51	1.57
Sheep	0.92	0.93	1.51

The NRS monitoring survey has been subjected to numerous technical reviews over the years by inspection teams from our major trading partners, particularly the USDA and European Commission (EC), with generally favorable results.

The independence, authority and recognized technical expertise of the NRS give the monitoring survey greatly enhanced credibility. The NRS is uniquely positioned in this regard – there is no other obvious service provider of similar standing.

Representatives of the cattle and sheepmeat peak industry councils have indicated a clear preference for NRS to continue managing the residue monitoring survey on behalf of their industries.

> **The independence and technical authority of NRS give the residue monitoring survey greatly enhanced credibility. NRS should continue to manage the survey for the cattle and sheep industries.**

The largest cost item in the residue survey is laboratory testing, which is outsourced by NRS to laboratories that have demonstrated proficiency and gone through a competitive tendering process. Unit testing costs are high because the analytical methods are quite specialised and complex, and apart from the residue monitoring survey there is little commercial demand for the tests. There seems little scope to reduce unit testing costs, though there are opportunities to reduce costs with changes to the profile of residues tested in the survey and/or number of tests performed.

There may also be opportunities to reduce the overhead costs of the program. The NRS costs of managing the residue monitoring survey should be independently reviewed, to ensure the service is provided in the most cost-effective manner. This is discussed in more detail in the section on financial efficiency and transparency.

> **The NRS costs of managing the residue monitoring survey should be independently reviewed, to ensure the service is provided in the most cost effective manner.**

Laboratory proficiency evaluation

Confidence in the accuracy of residue test results is critical, as laboratory testing underpins the full gamut of residue control activities - the residue monitoring survey, targeted residue testing programs, risk management residue testing by abattoirs, and associated R & D.

The laboratory proficiency evaluation (PE) scheme run by NRS provides the required confidence in laboratory test results. There are 24 PE programs relevant to the meat industry.

Laboratory proficiency evaluation requires specialist expertise in both chemistry and statistics. It is important that the proficiency evaluation is done by a party independent of any laboratory that provides a commercial residue testing service or may wish to tender for residue testing work. There are few service providers other than NRS with the necessary independence and technical expertise.

The current cost of the PE scheme is approximately $425,000 pa. NRS attributes this to industry programs in proportion to the number of samples tested. About two thirds of samples tested are for residues in meat, so the cost of the PE scheme to the meat industry is about $283,000 pa.

NRS charges laboratories a participation fee of $275 for two years. Costs recovered from laboratories during the current year amount to $7,650 or 3% service delivery costs. The remaining cost of the PE scheme for meat (~ $275,000 or 97% of service delivery costs) is recovered from the meat industry as an NRS overhead cost.

There is merit in keeping the laboratory participation fee low, so that laboratories are not discouraged from establishing and maintaining an analytical capability. Laboratories participating in a PE program have additional costs apart from the fee charged by NRS – maintaining the capability required and doing the PE tests, for which there is no financial reward. Maintaining laboratory capacity is an issue of concern, discussed in more detail below. There is no point in discouraging laboratory interest.

A case can also be mounted that PE is an integral part of providing an analytical laboratory service, and that the costs involved should be borne in full by participating laboratories, without subsidy from industry. It can also be argued that the user-pays principle applies regardless of how PE costs are recovered, as costs borne by participating laboratories are presumably passed on to their clients through testing charges.

On balance, laboratory participation fees seem much too low. An eight-fold increase in the participation fee (to $1,000 pa) would not be out of place. A $1,000 pa PE fee should not discourage laboratories interested in competing for residue testing work on a commercial basis. If all laboratories currently participating in meat PE programs continued to do so, laboratory fees would increase to $56,000 pa or about 20% or program costs. The sensitivity of laboratories to the increased participation fee should be taken into account in when fees are set for the subsequent PE testing cycle.

Laboratory participation fees for the proficiency evaluation scheme should be substantially increased.

The meat industry makes a significant funding contribution to the PE scheme. The NRS costs of managing the PE scheme should be independently reviewed, to ensure the service is provided in the most cost effective manner.

NRS should continue to manage the laboratory proficiency evaluation scheme for meat residues. However, NRS costs of managing the scheme should be independently reviewed, to ensure the service is provided in the most cost effective manner.

Maintaining laboratory capacity is an issue of long-standing concern. Ideally, for each residue of interest, there should be at least two independent laboratories proficient in the analyses required. This ensures that if one laboratory falls over for any reason, residue testing can continue. It also allows inter-laboratory comparison of results.

For each residue analysis required, there should be at least two independent, proficient laboratories.

There is a significant initial cost for a residue testing laboratory to implement and validate a new analytical method, and a significant ongoing cost to maintain proficiency. With little commercial demand for testing, if a laboratory does not have an NRS contract, it is difficult justify maintaining proficiency.

A stock take of residue testing laboratory capability in Australia and New Zealand is needed. Where the analytical capability is unacceptably sparse, it may be necessary to actively encourage laboratories to establish and maintain a residue testing capability. For example, NRS might award split contracts. This would help maintain a diversity of laboratory providers, but with each laboratory having a smaller test run, there would be an increase in analytical costs. The first step is to clearly establish the testing capability currently available for each residue of interest to the meat industry.

A stock take of laboratory capability in Australia and New Zealand is needed. It may be necessary to actively encourage laboratories to establish and maintain proficiency.

Targeted residue control programs

These programs are big-ticket items, which cost cattle industry levy payers about $1.5 million pa, with additional direct costs to both abattoirs and cattle producers, and a significant leveraged contribution by the States. Targeted residue control programs are currently not a major cost item for the sheep industry.

Table 2. Targeted residue control programs managed by NRS during 2001/02.

Project	Cost ($ 000)
National Organochlorine Residue Management (NORM)	985
Hormonal Growth Promotant audit	267
National Antibacterial Residue Minimisation (NARM)	139
Endosulphan residues in beef	88 *
Targeted Antibacterial Residue Testing (TART)	28
Targeted testing review	45

* Funded jointly by Cotton Australia

There is an expectation by our major trading partners that where residues above MRL are likely or of concern, an effective residue control program will be implemented. The NORM, NARM, TART and endosulphan control programs are needed for long-term access to a broad range of markets. They also reduce the risk of a residue incident causing short-term but nonetheless very costly market disruption. The HGP program is needed specifically for access to the European market.

Although the targeted residue control programs are effectively mandatory, there is considerable flexibility allowed in program management, design and delivery.

Most of the coal face work is done by export abattoirs (who collect samples), approved laboratories (who do the analytical testing), and the State Departments of Primary Industry (who undertake traceback investigations, do property risk assessments, assist with the development of property management plans and undertake general extension). MLA maintains the ERP data base.

The targeted residue control programs are designed by the peak industry councils in consultation with government. NRS coordinates program delivery at the national level. It disburses industry funds to participating abattoirs, laboratories and State Governments, audits operational and financial aspects of the programs, and convenes workshops and technical reviews as necessary.

It is not essential that NRS manages the targeted residue control programs. In the past, NRS has been a logical choice as program manager – because of its technical knowledge and understanding of the issues, commitment to work in partnership with industry, and direct access to the industry levies and reserves earmarked for residue control. Residue management is NRS core business. However, alternative service provider options and delivery models that might provide cost, performance, or other advantages over NRS should be explored.

Industry should actively explore alternative program management arrangements for the targeted residue control programs.

The targeted residue testing programs are presented to our overseas trading partners as part of an overall 'residue package'. Whatever arrangements are put in place for management of these programs in future, it is important that they remain internationally credible. However, this does not mean that they must be managed by the Commonwealth Government. There are other models where credibility is important, but service delivery is by a non-government organisation. A good example is Australia's animal health information system (NAHIS), where data is collated and interpreted by a consultancy company in the private sector, contracted to Animal Health Australia. AUSMEAT is another example of a non-government organisation delivering an internationally credible service to the meat industry.

There are advantages in having the suite of targeted testing programs managed by a single service provider such as NRS. However, there would also be advantages in making program management more contestable, with payment linked to the delivery of agreed performance standards. By contracting out program management, the costs involved would be more transparent than at present, and there would be a greater incentive for cost control. The ownership and use of project data, a long-standing industry concern, could also be controlled more effectively, with intellectual property requirements embedded into the contractual arrangements. Such conditions should apply regardless of who is appointed program manager, including NRS.

The essential requirements are that the program manager has a technical interest in the area, a commitment to professional excellence, a commitment to manage the program according to agreed guidelines, sufficient organisational resources to manage the program, and the authority to disburse industry funds for work done. There should not be a conflict of interest, with the program manager also delivering coal face services to the program.

To minimise the disruption and cost of changing program manager, appointments should be made for at least two years, with an option to terminate the contract if program management fails to meet minimum standards, and a review of program delivery towards the end of each cycle.

The NORM program is sufficiently large, complex and sensitive that it is difficult to imagine satisfactory program management by an organisation not currently associated with NORM. MLA is the only obvious alternative NORM program manager. MLA may not want NORM program management responsibilities. If MLA were to take on this role, there would be synergies with MLA's current role maintaining the ERP database, and with its market access activities. However, there would also be disruption from the transfer of management responsibilities from NRS to MLA.

If MLA were to assume responsibility for managing NORM, there would be a management hiatus of at least twelve months, and possibly much longer, whilst a NORM management brief is prepared, program management is put out to tender, MLA is appointed program manager, and the new management team settle in.

NORM has languished for the last two years, with changes to the program urgently needed but delayed by funding uncertainty and various residue reviews. The impact of further delays must be considered against potential efficiency gains from changing program manager.

On balance, it is more important to address immediate operational issues at the industry coal face and put any thoughts of changing program manager on hold for the time being. I recommend that NRS continues as NORM program manager, and that priority is given to implementing recommendations arising from the 2001 review of targeted testing programs.

NORM has languished for the last two years. Addressing immediate operational issues is a higher priority than changing program management.

The HGP program could be managed by a range of service providers, including NRS, MLA, AUSMEAT or a consultancy company in the private sector.

The NARM and TART programs should logically be managed together. They could also be managed by a wide range of service providers.

I recommend that management briefs are prepared for the HGP and NARM/TART programs, and that expressions of interest are sought nationally for management of these programs, for a two or three year period commencing 1 Jan 2004.

The process of industry developing formal management briefs, putting program management out to tender, and benchmarking interested parties will help clarify the tasks that need to be done and the real costs involved. It may be that NRS continues to manage the HGP and/or NARM and TART programs. If so, well and good. The cattle industry should be satisfied that, whoever is appointed, program management is focused and cost-effective.

If management of the HGP and/or NARM and TART programs were transferred to another service provider, it would give industry an opportunity to evaluate alternative national arrangements on a relatively small, trial basis.

Residue R&D and special projects

Until now, one-off residue surveys, residue project scoping and other R&D activities managed by NRS have been funded in full by industry. R&D managed by the rural research and development corporations attracts matching Commonwealth dollars, but R&D funded from NRS industry reserves does not attract a matching Commonwealth contribution.

Residue R&D projects managed by NRS during 2001/02 are shown in Table 3. Components of the NARM, NORM and endosulphan targeted testing programs, though not costed in the table, could also be classified as bona-fide R&D. About $200,000 was invested in residue R&D.

Table 3. R&D projects managed by NRS during 2001/02.

Project	Cost ($ 000)
Plantation risk assessment	94
Cadmium and lead survey in offal	69
Bioresmethrin scoping study	6
Zearalenone project	3
R&D components of the NORM, NARM and endosulphan projects	?

In future, MLA should manage residue R&D projects for the cattle and sheep industries, as these projects would then attract matching Commonwealth dollars. The industry share of R&D funding could also be distributed more equitably, with contributions from both the production and processing sectors, rather than just by producers.

MLA has established expertise in R&D project management, which is a core business activity. With MLA responsible for the management of residue related R&D, project delivery would continue to be contracted to the most suitable service provider, including NRS where appropriate. MLA management of R&D projects would also alleviate industry concerns about the ownership and use of data generated, as there would be tighter industry control of intellectual property.

MLA should manage residue R&D projects for the cattle and sheep industries.

A desire by industry to transfer funds from industry reserves held by NRS to MLA, for residue research purposes, has been thwarted by administrative difficulties. However, the change in cattle industry levy arrangements, effective from 1 March 2003, will achieve the same result, with cattle industry funds for residue R&D directed to MLA rather than NRS.

Residue projects will only ever be a small part of the MLA research portfolio. They will tend to be projects with a narrow focus, but high level of sensitivity. A residue R&D sub-program within MLA would provide cohesion and focus to this new area of work.

Quality assurance and printing of NVDs

During 2001/02, industry funds held by NRS were used to support the Cattlecare and Flockcare programs ($277,000) and printing of NVDs ($381,000).

There is a strong residue component to industry QA programs, and NVDs are necessary to demonstrate residue product integrity. The required legal justification for using NRS reserves can be met. Be that as it may, funding through NRS is indirect and can only divert NRS focus from its core business. Presumably the driver behind NRS involvement in these projects was the uncommitted industry funds available from NRS reserves.

Funding for Cattlecare, Flockcare and NVDs would fit more comfortably with MLA, with its broader responsibilities for product integrity and quality assurance programs.

Funding for Cattlecare, Flockcare and NVDs should be channelled through MLA.

Cost efficiency and financial transparency

NRS services to industry should be provided in the most cost-effective manner possible.

NRS accounts are maintained and reported in accordance with the *Financial Management and Accountability Act 1997* and the *National Residue Survey Administration Act 1992*, with auditing by the Australian National Audit Office. The cattle and sheep industries can be confident that good accounting practice is followed, NRS financial statements are accurate, industry reserves are invested as required, taxation requirements are met, and there is appropriate protection against fraud. However, NRS accounting and auditing procedures do not ensure that industry resources are used as efficiently as possible.

During this review, relocation of the NRS Central Receival and Dispatch facility to the Edmund Barton building was seriously questioned. No doubt having all NRS staff at one location is more convenient. However, is it necessary to have a sample packing facility in premium office space in Barton, when there are commercial premises available for lease elsewhere in Canberra for a fraction of the cost? It appears that although industry is expected to meet NRS operating costs, there has been little consultation with industry on issues that have a significant impact on costs.

Concern was also expressed about partitioning NRS overheads between programs. At present, NRS overheads are attributed across programs in proportion to the number of samples tested, with a slightly heavier weighting for smaller programs. Is this formula equitable? Are the cattle and sheep industries cross-subsidising residue programs for camels, deer, emu, game pigs, goats, kangaroo, ostrich and/or possums?

The move by AFFA during mid 2002 to substantially increase NRS corporate overhead charges raised a similar concern about equity. Were the cattle and sheep industries asked, because they had reserve funds available, to make a disproportionately large contribution towards AFFA overhead costs?

An independent efficiency audit is needed to ensure that non-contestable work done by NRS is as cost-effective as possible, and that cattle and sheep industry funds are not used to cross-subsidise residue monitoring for other smaller industries, or other AFFA activities.

> **An independent efficiency audit is needed to ensure that non-contestable work by NRS is as cost-effective as possible, and there is no cross-subsidy of other industries or activities.**

There is also a need for greater financial transparency and closer monitoring of program expenditure by industry - who foot the bill. The services required from NRS should be clearly defined and the cost of NRS service delivery locked in at the start of each project or year. There should be no financial surprises. It is not satisfactory for NRS overhead charges to be increased by several hundred thousand dollars, without detailing the real cost of service delivery.

> **The services required from NRS should be clearly defined and the cost of NRS service delivery locked in at the start of each project or year. There is a need for greater financial transparency and closer industry monitoring of program expenditure.**

NRS reporting

NRS has decided to combine the NRS *Annual Report* and *Report on the Australian National Residue Survey Results*, with the combined NRS report separate from the AFFA annual report.

There are likely to be significant cost savings from combining the two reports. As a stand alone annual report, NRS independence and financial transparency should be maintained. The proposed change should be supported by the cattle and sheep industries.

> **There are likely to be significant cost savings from combining the NRS *Annual Report* and *Report on the Australian National Residue Survey Results*.**

Adequacy of industry reserves

There are two key reasons for maintaining industry reserve funds beyond anticipated requirements for the current financial year:

- As a contingency, to allow a rapid response in a residue crisis.
- To ensure that fluctuations in transaction levy receipts do not prejudice program delivery in the short to medium term.

Under normal circumstances, it is not easy to increase industry levies, due to administrative requirements in the relevant legislation and/or the need for industry endorsement or political support. However, in the face of a residue crisis, revised levy arrangements could be fast-tracked. RMAC has substantial reserves that could be accessed in an emergency, but would need to be repaid from levy funds over time.

NRS recommends a target reserve for industry accounts of between 20% and 80% of the annual program cost.

Cattle industry

Over the last decade the cattle industry has had a series of residue incidents requiring a rapid response to protect market access. Food safety is a sensitive issue, and meat residues are an easy non-tariff trade barrier to employ. A resourcing mechanism is needed to enable a rapid and adequate response if/when the next incident occurs.

The response to the organochlorine residue crisis in 1987 cost tens of millions of dollars. Another residue crisis of this magnitude is unlikely, and in any case contingency funds are only needed for the initial response, until revised levy arrangements can be enacted and additional residue response funds come on-stream.

A more likely scenario is a residue incident such as chlorfluazuron or bioresmethrin - that appears suddenly and requires an immediate response, but can be managed with a program costing well under a million dollars.

Given the history of residue incidents emerging from left field with little warning, and the administrative and political difficulties raising levies, the cattle industry would be better able to respond to the unexpected if it erred on side of caution when setting an industry reserve target.

The cattle industry spends about $3.5 million pa on residue control programs managed by NRS. The upper end of the target reserve recommended by NRS (80% of annual expenditure) is therefore $2.8 million. This is sufficient to mount a rapid and adequate response to all but the most major of incidents.

Cattle industry NRS reserves have steadily increased over the last two years. At 30 June 2002, NRS reserves were $8.8 million. This is about $6 million more than is reasonably required, and should be managed down - there is no real benefit to cattle producers in holding such a large reserve, but an opportunity cost of locking up the funds. There is also a risk that excessive NRS industry reserves might be seen as a resource honey-pot to be harvested or diverted for purposes only remotely related to residues. Much better that NRS industry reserves are managed down to a more appropriate level.

The reduction in NRS cattle industry levy from 32¢ to 12¢, effective from 1 March 2003, should achieve exactly the required result – a slow but steady depletion of industry reserves. Assuming there is no major residue incident in the meantime, expenditure on the residue monitoring survey and targeted residue control programs remain much the same, and residue R&D is funded through MLA, it will take about five years for NRS cattle industry reserves to decline to $2.5 million. A further review of NRS reserves should be undertaken at that time.

I recommend that NRS cattle industry reserves are slowly but steadily depleted to about 80% of annual expenditure.

Sheep industry

The ad-valorem levy arrangements for the sheep industry make it more vulnerable to fluctuations in residue levy receipts. Sheep industry residue income and reserves held by NRS have increased over the last two years - a period of high sheep turn-off and prices. Residue expenditure has increased markedly over the same period, due principally to a sharp increase in the cost of the residue monitoring survey.

At 30 June 2002, NRS sheep industry reserves were $2.6 million, or about one and a half times annual program expenditure. Sheep industry reserves are above the 20-80% of annual expenditure range recommended by NRS, and are more than adequate as contingency for a residue incident.

Sheep industry reserves could be allowed to decline somewhat, however they are not that far above the desirable level. The sheep industry's residue levy stream is quite likely to decline over the next couple of years, with flock rebuilding after the drought and a plateau in sheep prices. Rather than tinkering with sheep industry levies, it would be better leave them as they are, but closely monitor residue income and expenditure over the next twelve months.

Sheep industry residue levies should be left unchanged for the next twelve months.

Industry consultation

The Banham report recommended that ... *'The Department canvases interest in the establishment of a national residue management advisory group to provide a forum that brings together industry, government and independent technical expertise for the issue of residue management and provides a national perspective to residue management.'*

The NRS Director has advised that AFFA intends to proceed with this recommendation, and that terms of reference for the advisory group are being developed.

SAFEMEAT oversees the broad strategic direction of Australia's meat residue programs and provides a forum for industry and government to consider residue management issues from a national perspective. NRS also has industry-specific advisory committees, such as the Beef Industry Advisory Committee (BIAC).

The benefits of another advisory group are not readily apparent. When developing terms of reference for the new group, NRS should try to avoid duplication of effort and costs, and not put in place procedures that will complicate, delay or confuse decision making.

> **SAFEMEAT provides a forum for industry and government to consider residue management issues from a national perspective. NRS also has industry-specific advisory committees. The benefits of another advisory group are not readily apparent.**

The States play a key role in delivery of the targeted residue testing programs. They also make a substantial resource contribution. However, apart from their sole representative on SAFEMEAT, the States seem alienated from and don't have much ownership of the SAFEMEAT process.

A consideration of SAFEMEAT is beyond the terms of reference for this review. However, there seems a clear need to improve information flow, in both directions, between SAFEMEAT and the State residue coordinators.

> **There is a need to improve information flow, in both directions, between SAFEMEAT and the States.**

Data protection

Data protection has been a long-standing issue of concern to industry. The problem involves protecting data arising from work fully-funded by industry. The Commonwealth has free access to data they have not paid for, and may use it to the detriment of the industry involved.

It is important that industry does not interfere with or in any way restrict publication of results from the NRS residue monitoring survey. To be credible and accepted by our trading partners, the monitoring survey must be independent and the results published without fear or favour.

The need for data protection lies not with the NRS monitoring survey, but with residue special surveys, R&D projects and targeted residue control programs; which may generate information that is commercially sensitive and needs to be managed with care.

The problem will be resolved in part by MLA taking responsibility for residue R&D. Confidentiality and intellectual property (IP) protection requirements will presumably apply to all residue projects funded by MLA.

Protection of data generated by other industry funded programs managed by NRS needs to be negotiated with government. An element of trust is needed. It is reasonable for residue data held by NRS to be used within the strict confines of the relevant government portfolio. However, such data should not be made available beyond that portfolio without prior approval from the industry funding the program.

Data protection needs to be negotiated with Government. Residue data held by NRS should be available for use by the Commonwealth Government within the agriculture portfolio, but should not be made more widely available without prior approval from the industry funding the program.

Residue reviews

The 2001 review of targeted residue control programs has yet to be implemented – a lost opportunity. The AEMS risk assessment of plantations and horticultural crops is also awaiting implementation. These reports should not be allowed to languish.

Recommendations from these reviews that have broad industry support should be implemented immediately. Recommendations that have only modest industry support should be reassessed and a firm decision made to either implement or reject the recommendation.

The targeted residue testing review and risk assessment of plantations and horticultural crops should not be allowed to languish. The recommendations from these reviews should be either rejected or implemented without further ado.

Cost implications

	Recommendation	Cost implication
1	The current system of reviewing the profile of chemicals in the residue monitoring survey continues as is. The raft of minor changes suggested as a result of this risk assessment is considered at the next scheduled review.	No net increase in costs.
2	Over the next twelve months, SAFEMEAT develops national policies on monitoring antimicrobial resistant organisms and management of genetically modified material in the animal food chain.	Costs will depend on the policy developed. As both are new areas of work, any costs involved will be additional to current expenditure.
3	Safe grazing intervals are established and made readily available for chemicals that pose a residue risk from consuming contaminated pasture or stock feed.	Some of the data required is held by NRA and chemical registrants. However, R&D will also be needed to fill information gaps. This recommendation needs progressive implemented over time. Cost will depend on the range of chemicals included and speed of implementation required.
4	An active watching brief is maintained across the full range of meat residue issues.	Reinforces the status quo. No cost change.
5	The Sheepmeat Council considers options for compliance with EU residue testing requirements, taking into account the additional costs involved, market access risks, value of the EU market and beneficiary-pays principle.	There is a potential cost saving to sheep producers of up to $600,000 pa, depending on the strategy adopted.
6	Industry representatives are more closely involved in all future market access negotiations that involve significant residue compliance costs.	Greater involvement by the industries footing the bill will put a greater focus on costs.
7	NRS continues to manage the residue monitoring survey for the cattle and sheep industries.	The status quo. No cost change.

	Recommendation	Cost implication
8	NRS continues to provide a laboratory proficiency evaluation service for meat residues, but with an increased proportion of the costs borne by participating laboratories.	There will be a slight reduction in NRS overhead costs charged to the meat industry. Unit testing prices may increase as costs are passed on by laboratories.
9	There is a stock take of residue laboratory capability in Australia and New Zealand.	The cost of a laboratory capability stock take should be small. The cost of supporting laboratories to maintain residue testing capability could be substantial. However, the first step is to clearly establish needs.
10	NRS continues as NORM program manager for the time being. Priority is given to implementing operational changes arising from the 2001 review of targeted testing programs.	The status quo. No cost change.
11	A management brief is prepared for the HGP audit program. Expressions of interest are sought nationally for program management, for a two or three year period commencing 1 Jan 2004.	The impact on costs will depend on tender responses. Costs are likely to go down with competitive tendering.
12	A management brief is prepared for the NARM/TART programs. Expressions of interest are sought nationally for program management, for a two or three year period commencing 1 Jan 2004.	The impact on costs will depend on tender responses. Costs are likely to go down with competitive tendering.
13	MLA manages residue R&D projects for the cattle and sheep industries.	Future R&D projects will attract matching Commonwealth dollars. Industry funds will be contributed by both producer and processing sectors, rather than just by producers alone.
14	There is an independent efficiency audit of NRS, to ensure that non-contestable work is as cost-effective as possible, and there is no cross-subsidy of other industries.	Cost will depend on the terms of reference and consultant employed. A suitable audit is likely to cost $50,000 - $60,000. This is a one-off cost.
15	Funding for Cattlecare, Flockcare and NVDs is channelled through MLA rather than through NRS.	This is a procedural change. The funding pathway will change, but there will be no change in the net cost to industry.

	Recommendation	Cost implication
16	NRS cattle industry reserves are slowly but steadily depleted to about 80% of annual expenditure.	This will happen automatically from the reduction in the NRS residue component of the cattle industry levy.
17	Sheep industry residue levies are left unchanged for the next twelve months.	The status quo. No cost change.
18	SAFEMEAT reviews its interaction with the States. The States need to have greater ownership of the SAFEMEAT process. Information flow, both ways, needs to be improved.	The cost of a strengthened linkage between SAFEMEAT and the States should be minimal.
19	A data protection agreement is negotiated with AFFA, allowing residue data held by NRS to be used within the agriculture portfolio, but not made more widely available without prior approval from the industry funding the program.	This should involve minimal cost.
20	Recommendations from the review of targeted residue testing programs and the AEMS risk assessment of plantations and horticultural crops that have broad industry support are implemented without further ado.	Costs will depend on which of the raft of recommendations are accepted.

Appendix A Terms of reference

A review of market support and research needs for residue management

Purpose

To identify existing and potential residue hazards for the red meat industry, using a risk assessment process.

To recommend priorities for residue risk mitigation and a balanced portfolio of project work to be funded by industry over the next 5 years to:

(a) support ongoing market access (fully funded by industry); and

(b) address emerging residue issues (R&D funding, 50/50 by industry and government).

Background

Chemical residues in meat impact on access to international markets by the Australian red meat industry. The level of work involved in managing residue issues continues to increase, as does the time committed by industry representatives. The expenditure required to deal with these issues is also increasing. SAFEMEAT has not conducted a detailed review of work priorities in this area.

This review will assist agencies to establish future work plans and budgets. It will also help to clarify the source of funds and accountabilities for management and communication on chemical residue issues to avoid market disruption.

Scope of work

1. The review should include, but not be limited by, the following residue issues as they relate to the red meat industry:

   - Antibiotics
   - Antibiotic resistant organisms
   - Hormone treatments
   - Naturally occurring toxins
   - Dioxins
   - Chemicals used by other agricultural industries on adjacent lands (cotton, plantations, cereal grain and legume production)
   - Risks of grazing other land use areas (tobacco, sugar, banana country)
   - Agricultural chemicals applied to grain and other feedstuffs.

2. Ascertain from participating industries end-user current and future needs and reporting requirements from the NRS program.

3. Review NRS framework and operating principles as provided in the AFFA NRS review 2002.

4. Ascertain the adequacy or otherwise of existing advisory forums in regard to the development and reporting of NRS programs.

5. Review the transparency and contestability of program administration, management and coordination of testing activities.

6. Review management of NRS reserves, investment strategies and reporting.

7. The recommendations in the review should be based on sound risk assessment principles, around the assumption that:

   - current random monitoring and targeted testing programs need to be maintained and are largely dictated by EU, US and Asian market entry requirements. Domestic requirements as set out by FSANZ also need to be fulfilled.

   - product integrity/ food safety issues will remain in the forefront of the market.

Appendix B Acronyms and abbreviations

ALFA	Australian Lot Feeders Association
AQIS	Australian Quarantine and Inspection Service
BIAC	Beef Industry Advisory Committee
CCA	Cattle Council of Australia
ERP	Extended Residue Program (data base)
EUCAS	European Union Cattle Accreditation Scheme
FSANZ	Food Standards Australia, New Zealand
GM	Genetically modified
GMO	Genetically modified organism
IP	Intellectual property
MLA	Meat & Livestock Australia
NARM	National Antibacterial Residue Minimisation Program
NLIS	National Livestock Identification Scheme
NORM	National Organochlorine Residue Management Program
NRA	National Registration Authority for Agricultural and Veterinary Chemicals
NRS	National Residue Survey
NVD	National vendor declaration
OC	Organochlorine
PIC	Property identification code
TART	Targeted Antibacterial Residue Testing Program